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OBSERVATIONS ON THE KNOT (*TRINGA CANUTUS*).

BY GEORGE H. MACKAY.

THIS bird, which formerly sojourned on these shores in great abundance, and occurs now to a limited extent during its migrations, has been the subject of considerable inquiry as to the cause of its appearing now in such reduced numbers. As each contribution to the subject may add something in assisting correct conclusions I have ventured to present the following résumé, especially of the habits and movements of this bird during its short stay in Massachusetts while on migration. The Knot, Red Breast, or Robin Snipe, is cosmopolitan in its migrations, visiting various portions of either hemisphere. Little is known, however, of its breeding places, and authentic eggs are almost entirely unknown in collections. Lieut. Greely is reported to have discovered an egg with the bird in the vicinity of Fort Conger, in Lat. 81° 33′ (Auk, II, 313). It has been found breeding along the shores of Smith's Sound and the north coast of Grinnell Land. Sabine in 1820 found it nesting in great numbers on Melville Island, and in Parry's first voyage he found it breeding on the North Georgian Islands. Capt. Lyons also in 1823 found it breeding on Melville Peninsula. On July 30, 1876, Mr. Henry W. Fielding noted an old bird with three nestlings at Knot Harbor, Grinnell Land (Baird, Brewer and Ridgway, Water Birds, Vol. I, p. 214). On the west coast of the Pacific it migrates as far south as Australia and New Zealand to winter, passing Japan and China. It also winters in Damara Land, Africa, and in America has been taken as far south as Brazil. The American bird differs only in size from the Japanese bird (*Tringa crassirostris*), which is larger (Seebohm's Plovers, pp. 421, 424). It is abundant during migrations on the coast of British Columbia ('Check List of British Columbian Birds,' by John Fannin). Mr. Ernest E. Thompson ('Birds of Manitoba') also notes it as a spring migrant in Manitoba. Messrs. Sclater and Hudson make no mention of it in their 'Argentine Ornithology,' so if it reaches the southern portion of the South American continent it has escaped their observation.

In Massachusetts the adult birds first make their appearance from the middle to the last of July on their southern migration, the height of their abundance being about the first of August; the latest I have heard of the adults being taken (an adult male) was October 6, 1887, at Monomoy Island, Cape Cod, with two exceptions, when on Dec. 28, 1879, during a thick snowstorm, Mr. Lorenzo Hamilton of Chatham, Mass. (now living at Billingsgate), shot eight old, deep red-breasted birds near Chatham Light from a flock of twenty, all of which had deep red breasts. On Feb. 22, 1892, he also shot two old deep red-breasted birds (all there were) at Billingsgate, Cape Cod. The young gray-and-white birds appear while making their southern migration during the latter part of August to September 10; and the latest I have heard of their being taken was October 5; they generally move south late in September.

In the spring during migration northward some few early birds appear about May 12, and they continue coming, and remain until the first week in June, when all the birds have passed north. I have known of good shooting on June 3, but the height of abundance used to be the last few days in May. The most favorable time to expect them at this season is during fine, soft, south to southwest weather, and formerly they could be expected to pass in numbers between May 20 and June 5. In former times, when such conditions prevailed, thousands collected on Cape Cod, when they would remain from a few days to a week before resuming migration.

That the Knot can withstand our winter climate is shown by the fact that I shot on a shoal adjacent to Muskeget Island, Mass., on March 19, 1890, two Knots, one of which (a male) was saved and is now in the collection of Mr. William Brewster. There had been three in all, and they were all in the gray and white plumage; the one skinned was very fat. The day on which I shot them the most severe northeast snowstorm of the winter prevailed. They had been living in this locality the greater portion of the winter, being observed from the middle of January up to the time they were shot. I was informed, however, that none had been noticed in this locality at this season before. On January 12, 1879, Mr. Outram Bangs of Boston noticed a female in the gray and white plumage hanging in a bunch of Purple Sandpipers (*Tringa maritima*) in a stall in Faneuil

Hall Market, Boston. On inquiry, after purchasing the bird, which is now in his collection, he learned the bunch of birds came from St. John, New Brunswick, and the Knot probably was shot in that locality about that date.

The Knot is a favorite bird with sportsmen, on account of its answering the call whistle and coming to the decoys so readily, often a second and occasionally a third time, after having been shot at, for they are either very tame or very shy according to whether they have been harassed. When shy, and coming to decoys to alight, they barely touch their feet to the sand before they discover their mistake and are off in an instant. They fly quickly and closely together and, when coming to decoys, usually pass by them down wind, most of the flock whistling, then suddenly wheeling with heads to the wind, and up to the decoys. At such times many are killed at one discharge. They are only fair eating, being a little fishy in flavor. They make two notes. One is soft, of two articulations, and sounds like the word 'Wah-quoit' (by which name it is sometimes known on Cape Cod); although uttered low it can be heard quite a distance. This note is particularly noticeable when flocks are coming to the decoys; it has a faint rolling sound similar to the note of the American Golden Plover (*Charadrius dominicus*) under the same conditions, only more subdued and faint. The other is a single note resembling a little honk. These birds will also respond to the note of the Black-bellied Plover (*Charadrius squatarola*) as readily as to their own, when it is given with a whistle.

Knots feed on the marshes and also on the sand flats near the edge of the water, where they find marine insects and their larvæ. Those birds living south of Cape Hatteras feed to a large extent on a small mollusc (*Donax variabilis* Say). They also frequent the flats at night as well as in the daytime. As far as I know I should say their food was the same as that eaten by the Black-bellied Plover. Like them they also eat the larvæ of one of the cut worms (Noctuidæ) which they obtain on the marshes, and some of which I have found still in their throats after they were shot. Mr. William Thompson in his most charming work ('Natural History of Ireland') mentions that there they feed chiefly on minute mollusca, especially *Paludina muriatica* Lam., also on the young of *Littorina rudis*. On the ground they are sluggish, and not given to moving about much; unless

very much harassed they are not nearly so vigilant as their companions, the Black-bellied Plover, but when they have become shy they are exceedingly wary and always on the alert for danger.

When the incoming tide drives the Knots from the flats they seek the marshes, or some shoal which is sufficiently elevated to remain uncovered during high water; they also frequent the crest of the beaches. Here they generally remain quiet until the tide has fallen sufficiently to permit them to return again to the flats to feed. When on the marshes during high water they occupy some of the time in feeding, showing they are by no means dependent on the flats for all their food. They associate and mingle as freely with the Turnstone (*Arenaria interpres*), Black-bellied Plover (*Charadrius squatarola*), and Red-backed Sandpiper (*Tringa alpina pacifica*) as with their own kind, and apparently evince the same friendship toward the two former birds as prevails between the American Golden Plover (*Charadrius dominicus*) and the Eskimo Curlew (*Numenius borealis*). I have heard of but one instance (at Revere, Mass., during a storm) of the Knot being noted in the same flock with adult American Golden Plover. At this time there were three, one of which was shot. I have heard, however, of both adult and young Knots mingling with young American Golden Plover, or 'Pale-bellies,' as they are locally called.

For twelve years past the number of Knots in the spring in the vicinity of Tuckernuck Island has not averaged more than fifty birds, so I am informed on good authority. At this season they sometimes frequent the upland on the island in company with the Turnstone, never doing so, however, in August or September. From the time they are first noted at this latter season they seem to come along quite continuously a few at a time until migration ceases. Knots as a rule are not in the habit of frequenting uplands as they do the marshes. I account for their doing so in this instance in the spring by the fact of there being no marshes in the vicinity, and by their being mingled with the Turnstones which are in the habit of frequenting such places. They are induced in consequence to follow the Turnstones where they lead, this bird showing more determination of purpose than the Knots which frequently yield and follow them. This is not the case with the Turnstones; they often leave the combined flock rather than be led where they do not care to go.

On the Dennis marshes and flats, at Chatham, the Nauset, Wellfleet, and Billingsgate, Cape Cod, and on the flats around Tuckernuck and Muskeget Islands, Mass., they used to be more numerous than in all the rest of New England combined, and being very gregarious they would collect in those places in exceedingly large numbers, estimates of which were useless. This was previous to 1850 and when the Cape Cod railroad was completed only to Sandwich. Often, when riding on the top of the stage coach on the Cape beyond this point, immense numbers of these birds could be seen, as they rose up in clouds, during the period that they sojourned there. It was at this time that the vicious practice of 'fire-lighting' them prevailed, and a very great number of them were thus killed on the flats at night in the vicinity of Billingsgate (near Wellfleet). The mode of procedure was for two men to start out after dark at half tide, one of them to carry a lighted lantern, the other to reach and seize the birds, bite their necks, and put them in a bag slung over the shoulder. When near a flock they would approach them on their hands and knees the birds being almost invariably taken on the flats. This practice continued several years before it was finally prohibited by law. I have it directly from an excellent authority that he has seen in the spring, six barrels of these birds (all of which had been taken in this manner) at one time, on the deck of the Cape Cod packet for Boston. He has also seen barrels of them, which had spoiled during the voyage, thrown overboard in Boston Harbor on arrival of the packet. The price of these birds at that time was ten cents per dozen; mixed with them would be Turnstones and Black-bellied Plover. Not one of these birds had been shot, all having been taken with the aid of a 'fire-light.'

As they appear on our shores each season at about the same date as the Black-bellied Plover, which, however, they formerly always greatly outnumbered, I venture to suggest for the Knots the same possibility of a change of habitat and of lines of migration that I did when considering the cause of that bird's lessened numbers (Auk, IX, 143). I consider the case of the Knots a much more aggravated one than that of the Black-bellied Plover, the Knots having been reduced to a much greater extent in my opinion by having been killed. Besides those destroyed on Cape Cod through the agency of 'fire-lights,' I have reasons for believing that they have been shot also in large numbers on the

Atlantic seaboard (Virginia) in the spring on their way north to their breeding grounds, one such place shipping to New York City in a single spring, from April 1 to June 3, upwards of six thousand Plover, a large share of which were Knots. This was about thirty years ago, but it nevertheless serves to illustrate what kind of treatment these birds received in those days, as well as since, and bears out the current belief of today that the Knots in a great measure have been killed off. In more recent times we find every locality along the shore, where shooting can be obtained, accessible at short notice to sportsmen, who are ever ready to avail themselves of weather conditions likely to land birds; and should any arrive, they are immediately pursued, and those not killed are driven away. Therefore as passing flocks receive no answer to their call of inquiry, and as those birds which have been over the same route a number of times before (having become leaders of migratory flocks) have learned what invariably awaits them in certain localities, the remnants of the once large numbers pass on, carrying their companions with them, being unwilling to risk the death or persecution that awaits them at all times; for there is never any cessation.

It is not my intention to convey the impression that the Knots are nearly exterminated, but they are much reduced in numbers, and are in great danger of extinction, and comparatively few can now be seen in Massachusetts, where formerly there were twenty to twenty-five thousand a year, which I consider a reasonable estimate of its former abundance. Mr. S. Hall Barrett informs me that he has not shot a single old red-breasted bird for the past five years on Cape Cod, although he has been on the ground that they would frequent during the proper season for them to pass, but he has seen about one hundred young, gray-and-white birds a year. His place of observation was Billingsgate Light House, one of the best places for such birds on Cape Cod. In old times he has seen as many as twenty-five thousand birds (estimated) in one year. On the other hand, Mr. C. L. Leonard of Marshfield Hills, Mass., informs me that on Cape Cod, generally near Barnstable, he sees annually about one hundred adult birds with full red breasts (and takes more or less of them), and about one thousand young gray and white birds, from their first arrival until October. This gentleman also informs me that he does not believe after his past fifteen years' experience that these birds

ever change back to the gray and white plumage of the younger birds after once attaining the adult full plumage of brick red on the underparts.

They are still found in greater or less numbers along the Atlantic coast south of Chesapeake Bay. Near Charleston, S. C., Mr. William Brewster noted about one hundred and fifty Knots on May 6 and 8, 1885, and saw a number of flocks on May 13. They were flying by, or were alighted, on Sullivan Island beach. On May 17, 1883, he noted about one hundred of these birds in the same locality. In the spring they pass Charlotte Harbor, Florida, so I am informed, in large numbers, coming up the coast from the south (a flight on May 26, 1890), at which time they are very tame. They are also more or less numerous near Morehead City, North Carolina (where they are known as 'Beach Robins'), from May 15 to 30, their flight being along the beach, just over the surf, at early morning, coming from the east in the neighborhood of Point Lookout, ten or twelve miles away, where they probably resorted to roost. This indicates that these birds were living in that locality. As late as twelve years ago I understand from very good authority that Knots were abundant from May 20 to June 1 on the Magdalen islands. During spring when they were on migration they used to be abundant on Lake Ontario, but I am not in possession of any late data regarding their movements at that point.

To me the Knots are very handsome birds in the full adult plumage; their red, Robin-like breasts and lower parts with their reddish-and-black-spotted backs, make a soft blending of color most pleasing to the eye. The plumage of the female, on the back, is sometimes duller and with less red than in the male, often without any red. It is from their resemblance to the American Robin (*Merula migratoria*) that their local names of Robin Snipe and Beach Robins (the latter on the North Carolina coast) have been given them. The plumage of the young birds (sometimes called 'Whitings' on Cape Cod, and which are usually smaller than the adults) is of a general slate gray for the upper parts, and white underneath, with neck, breast, and sides streaked with fine slate-colored lines. This is so unlike the plumage of the old birds that they are often mistaken for a different species by those not familiar with them.

I desire to call attention to the universal statement current in

the literature of the subject that the adults assume what is designated as the winter plumage, that is, gray above and white underneath, similar to the plumage of the young birds. I can but believe that such statement is an error of long standing, it being my conviction that such gray and white plumage is confined exclusively to the younger birds, and is retained by them in varying stages up to three or four years of age, or in other words until such time when they change it (never to reappear in it) for that which is known as full spring plumage. I have yet to see what I understand to be an old bird, from any locality in any season, in the gray and white plumage. Lest I may be misinterpreted, permit me to add that as these birds do not, in my opinion, reach the height of their plumage until they are three or four years old my remarks apply only to birds of that age or over. Mr. Geo. A. Tapley of Revere, Mass., who is a close observer and has shot as many of these birds as any one in Massachusetts, and whose shooting experience extends over a period of about fifty years, informs me that he has in the past shot in every year a good many old birds in full plumage on Cape Cod, Mass., in August and September. He says he never saw what he calls an old bird in the gray and white plumage. Mr. S. Hall Barrett of Malden, his fellow sportsman and of the same number of years' experience, reiterates Mr. Tapley's statements, and I am myself in full accord with both. Owing to the variation of plumage a large series of these birds is imperative in order to arrive at satisfactory results.

After examination of thirty-eight specimens of adult Knots, twenty-four of which were females, I came to the conclusion that there is no constant feature in the plumage of either sex, whereby they can be distinguished one from the other by the ordinary observer, both sexes varying considerably. Some of the females have no red on the back and scapulars, others have a little, and still others as much as the males. In this respect the males are much more constant in their plumage than the females appear to be. In size both sexes are apparently alike. The lower parts of adult birds of both sexes, from the bill to the abdomen, are of a dark vinaceous cinnamon varying in intensity. An examination of eighteen specimens of what I understand as the younger birds, shows their upper parts to be, in general, gray, with the neck, breast, and sides gray, streaked with V-shaped

lines or marks; the lower parts and abdomen are white. This stage of plumage seems constant with only a slight occasional variation. I cannot say as much, however, for the plumage of the older birds. A considerable portion of these young birds are smaller, while some are about the same size as the adults.

Full-plumaged specimens of the Knot are even now not easy to obtain in New England, and the day is not far distant, if it is not already here, when the fine series belonging to Mr. William Brewster will be a prize indeed. To him I am much indebted for their use, also for being able to refer to several of them which, while they are not all I could desire as regards dates of capture, are, together with a few others I have, the best I am able to obtain at this time, to illustrate the point at which I take issue. If the old birds migrate north in June, in their full spring plumage, when they return from the middle of July to September they would have changed, I should suppose, at least in part, if the old statement is correct, into the so-called winter plumage of gray above and white underneath. How is it, then, that sportsmen who have shot these birds all their lives have been able to take so many in full adult plumage on Cape Cod in July, August, September, and occasionally in October? The following specimens are in Mr. Brewster's collection. No. 18,945 is a male, but not an old bird, taken Oct. 6, 1887, at Monomy Island, Cape Cod, by J. C. Cahoon. The breast and lower parts of this bird are washed with pale cinnamon red. No. 19,188, taken at same place by same collector, is a rather young bird with only a cinnamon shading on breast and lower parts. No. 12,727, a male taken at Shelter Island, N. Y., Sept. 6, 1883, is quite an old bird and has considerable cinnamon red on breast and lower parts. No. 1363 (Bangs collection), a young bird taken at Isles of Shoals, Aug. 24, 1877, has only a few red feathers on the breast. The Smithsonian Institution has a female, No. 78,419, taken Sept. 1, 1879, at Big Pass, Florida, which has the entire lower parts, including throat, pale cinnamon red; it is not an adult, however. I have an adult male taken by N. E. Gould on July 15, 1889, at Chatham, Mass.; the entire lower parts from the bill are of a clear deep vinaceous cinnamon, without a white feather. I have a specimen collected by J. C. Cahoon, July 30, 1886, on Cape Cod; it is an adult female with lower parts cinnamon red from base of bill, with a few white feathers intermixed.

I have also a male taken Aug. 17, 1889, by N. E. Gould on Cape Cod; the whole lower parts of this bird from the bill to the abdomen are cinnamon red. Mr. Henry W. Abbot and Mr. Richard D. Ware, of Boston, visited the Magdalen Islands the past summer. On Aug. 23, 1892, they shot a full-plumaged Knot; on Aug. 30 two more were obtained with full red breasts and mottled backs; on Sept. 5 still another full-plumaged bird was taken. There were in addition two or three others in similar plumage which they secured, but for which the exact dates cannot be fixed. In Mr. Brewster's collection are six Knots all of which were shot on May 11, 1885, in South Carolina; one of them is all gray above and white underneath; one is of a deep vinaceous cinnamon on the underparts from the bill to the abdomen; and four are in varying stages of plumage between. It is an interesting little group, showing the development of plumage, on the same date, of birds of different ages.

I append some notes taken by an old shooting friend, Mr. Augustus Denton, which he gave me in 1877; those for the last five years are my own. They are for Cape Cod, Mass., unless otherwise specified. They serve to indicate the movement of the Knots northward in the spring.

1858, May 27.— First birds shot; most on the 31st.

1859 } .— Practically the same as above.
1860 }

1861, May 27.— First birds shot.

1862.— Very few birds.

1863, May 27.— First birds shot.

1864, May 27.— First birds shot.

1865, May 26.— First birds shot. Some birds in August, shot 26 this month.

1866.— Very few birds.

1867, May 27.— First birds shot; most on the 29th and 31st.

1868, May 23.— First birds shot; most on the 27th to 30th.

1869, May 27.— First birds shot, only very few birds.

1870.— Law prohibiting shooting in the spring.

1871, May 17.— First birds shot, earliest I have ever known them to appear, best shooting up to the 20th. A good many birds in August. Law prohibiting spring shooting repealed.

1872, May 25.— First birds shot, numerous this year.

1873, May 19.— First birds shot, abundant until the 31st.

1874, May.— Best shooting up to the 29th. Few birds in August.

1875, May 14.— First birds shot, best shooting 29th. Few birds in August.

1876, May 20.— First birds shot, best shooting on the 26th.

1877, Sept. 28.— Shot one on Nantucket Island, Mass.

1884, Aug. 25.— Shot two on Nantucket Island.

1891, about Aug. 20.— Twenty shot on Tuckernuck Island, Mass.

1891, Sept. 7.— Quite a flight of young birds passed Essex, Mass.; wind northeast with rain, storming hard.

1892, May 11.— Tuckernuck Island, first birds seen (three). June 1, seven seen (adults). Aug. 2, Muskeget Island, Mass., I saw eight Knots, and shot one which had some red feathers on the breast, and was very fat. Aug. 3, Muskeget Island, saw one, with an apparently full red breast, but failed to secure it.

SUMMER BIRDS OF INDIANA AND CLEARFIELD COUNTIES, PENNSYLVANIA.

BY W. E. CLYDE TODD.

WHEN we come to examine and compare the summer birds of Beaver, in Beaver County, Pennsylvania, with those found at that season in the Buffalo Creek region of Butler and Armstrong Counties, about forty miles directly to the eastward, a striking difference at once becomes apparent. This difference consists in the entire absence or rarity in the latter locality of a number of more or less typical Carolinian species which are characteristic birds at Beaver, and in the infusion instead of certain Allegha-nian and Canadian forms. As might be expected, there is a corresponding difference in the flora of the respective sections, which is especially marked in the character of the forest, coniferous trees of three species,—white pine (*Pinus strobus*), pitch pine (*Pinus rigida*), and hemlock (*Tsuga canadensis*),—which are rather local and not common in Beaver County, predominating in the other locality. But it is to be observed that this preponderance of conifers exists only in the vicinity of streams, the higher upland forests differing little, if at all, from those of like situation in Beaver County, though here and there a solitary conifer may be found.

In order to investigate the country still farther to the eastward, in Indiana County, I spent four days, June 22 to 25, 1892, in this